Effect of Cash Conversion Cycle on Firm Performance of Quoted Manufacturing Firms in Nigeria

Abstract

This study examines the effect of the cash conversion cycle (CCC) on the firm performance of quoted manufacturing firms in Nigeria. The study adopted the ex-post facto research design. The sample comprised twenty-one quoted manufacturing companies on the Nigerian Stock Exchange selected using the purposive sampling technique. The study relied on secondary data which was analysed using multiple regression techniques. The results showed that CCC had a negative non-significant effect on return on assets (ROA) and return on equity (ROE). Additionally, Generalised Least Squares were used to test for individual components of the CCC effect on ROA and ROE. The study recommends that managers pay crucial attention to the working capital components and the utilisation of technological breakthroughs, such as the Advanced Manufacturing Techniques as it affects the value of the firm.

Keywords: cash conversion cycle, Manufacturing Firms, Nigeria, technological breakthroughs

1.1 Introduction

Gitman (1974) introduced "the cash conversion cycle as a means of managing a firm's working capital", "which is often used to evaluate the risks and returns associated with liquidity management" (Appuhami, 2008). "The cash conversion cycle measures the length of time it takes to convert cash into cash, from the point of a firm's purchase of inventory and the receipt of cash from accounts receivable"(Ehrhardt & Brigham, 2008; Padachi, 2006). "The cash conversion cycle is a useful way of assessing the liquidity of a firm" (Moss & Stine, 1993). "The cash conversion cycle posits that ceteris paribus, efficient working capital management (i.e. a short cash conversion cycle) will increase a firm's liquidity, profitability and concomitantly its value, while inefficient working capital management (i.e., a long cash conversion cycle) will lead to lower profitability and lower firm value" (Oseifuah & Gyekye, 2017). "Companies can enhance their profitability by lessening the length of the cash conversion cycle by decreasing or lessening the receivables collection period, decreasing or lessening the inventory selling period and increasing or lengthening the credit payment period" (Anser & Malik, 2013).

"The management of accounts receivables, inventory and accounts payable has a tremendous impact on cash flows; and, in turn, affects the profitability of a firm" (Cote & Latham, 1999; Dar & Anuradha, 2018, 2020a, 2020b). "Thus, the cash conversion cycle of individual firms highlights how firms are performing; and, helps management dig out areas for further improvement" (Hutchison, Farris, & Anders, 2007). "The manufacturing sector is crucial to Nigeria's growth and development. In developed countries, the manufacturing sector accounts for a significant share of the industrial sector" (Ajayi, 2007). "The Nigerian manufacturing industry has witnessed a declining productivity rate, caused largely by inadequate electricity supply, smuggling of foreign products into the country, trade liberalisation, globalisation, high exchange rate, low government expenditure, and recession, among others" (Obamuyi, Edun, & Kayode, 2012). This has resulted in reduced capacity utilization and input of the manufacturing sector.

"Studies on the cash conversion cycle have been conducted in developed economies; however, few are regarding developing economies" (Yasir, Majid, & Yousaf, 2014Majeed, Makki, Saleem, & Aziz, 2013). "The studies on the relationship between the cash conversion cycle and firm performance present mixed findings. The findings can broadly be classified into two: linear positive" (Zakari & Saidu, 2016) or negative (Ukaegbu, 2014; Ben-Caleb,

Olubukunola, & Uwuigbe, 2013; Uwuigbe, Uwuigbe, & Ben-Caleb, 2012) relationship. Zakari and Saidu (2016) reported "a significant positive relationship between the cash conversion cycle and corporate profitability of Nigerian-listed telecommunication firms". Ukaegbu (2014) using "data from four African countries, Egypt, Kenya, Nigeria and South Africa, showed a significant negative relationship between cash conversion cycle and corporate profitability". "Other studies show a non-linear relationship between the cash conversion cycle and profitability" (Oseifuah & Gyekye, 2017).

1.2 Objectives of the Study

The main objective of the study is to ascertain the effect of the cash conversion cycle on the firm performance of quoted manufacturing firms in Nigeria. Specifically, the study intends to:

1. Examine the effect of the cash conversion cycle on the return on assets of quoted manufacturing firms in Nigeria.
2. Examine the effect of the cash conversion cycle on the return on equity of quoted manufacturing firms in Nigeria.

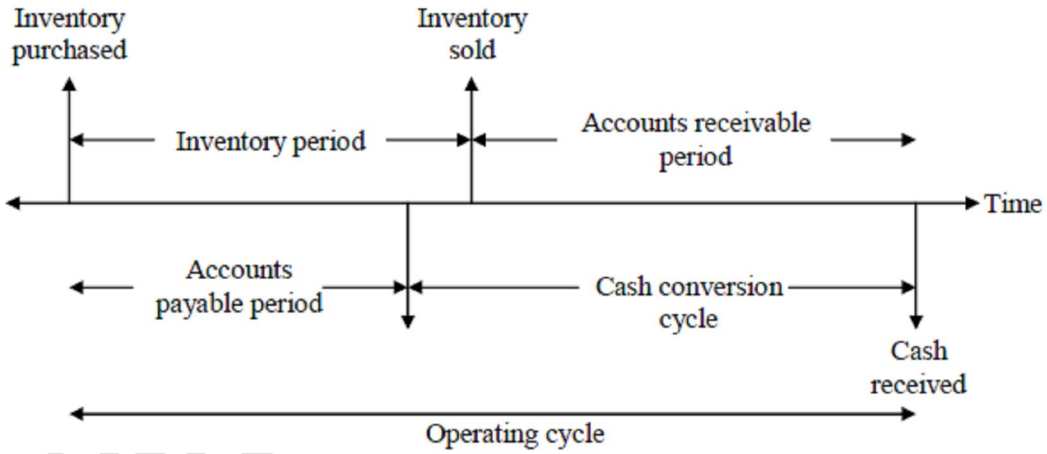
2.0 Review of Related Literature

2.1 Conceptual Review

2.1.1 Cash Conversion Cycle (CCC)

"The Cash Conversion Cycle is used as a comprehensive measure of working capital as it shows the time lag between expenditure for the purchases of raw materials and the collection of sales of finished goods" (Padachi, 2006). According to Keown, Martin, Petty, and Scott (2003) "cash conversion cycle can be defined as the sum of days of sales outstanding (average collection period) and days of sales in inventory less days of payables outstanding". CCC is "the length of time a company's cash is tied up in working capital before that money is finally returned when customers pay for the products sold or services rendered" (Churchill & Mullins, 2001). CCC is a composite metric that has been described as "the average days required to turn a dollar invested in the raw material into a dollar collected from a customer" (Stewart, 1995).

Figure 1: The cash conversion cycle



Source: Jordan (2003)

"The CCC may be positive or negative, a positive result indicates the number of days a company must borrow or tie up capital while awaiting payment from a customer. A negative result indicates the number of days a company has received cash from sales before it must pay its suppliers" (Hutchison, Farris, & Anders, 2007). "CCC for a manufacturing company can be defined as a function of [days of accounts receivable + days of inventory – days of accounts payable]" (Deloof, 2003). "The receivable collection period measures the average number of days from the sale of goods on credit to collection from account receivables. It is calculated as [(account receivables/sales) *365]. The inventory conversion period contains

the time required for the conversion of raw material into finished goods. It is calculated as [(inventory/cost of goods sold*365]. The payables deferral period is the average time needed to purchase goods on credit and final payment for them. It is calculated as [(account payable/cost of goods sold) *365]". (Deloof, 2003).

2.1.2 Firm Perofmance

"Performance is the ability of a business to earn a profit, grow and survive in the long run. Profit is the primary objective of a business" (Nimalathasan, 2009). The study focuses on firm performance measured through profitability. Profitability is "the ability of a given investment to earn a return from its use" (Nimalathasan, 2009). Profitability is a relative measure of earning capacity (Nishanthini & Nimalathasan, 2013). "The two proxies employed in the study are the ROA and ROE; both measure the management efficiency in the use of organisational resources. The ROA and ROE are Affected determined by internal and external factors. Internal determinants of profitability are firm-specific while the external factors are industry related. Internal factors of size, liquidity, leverage and financial assets of the firm have been found to have a major impact on profitability" (Khawaja, Bhutto, Butt, & Abbas, 2011).

2.1.3 Cash Conversion Cycle and Firm Performance

"The CCC plays a crucial role in influencing firm performance through efficient management of its components, which includes the receivable collection period, inventory conversion period and payable deferral period" (Weinraub & Visscher, 1998). Studies have documented varying effects of CCC on firm performance depending on the proxy utilised. For instance, Zakari and Saidu (2016) in Nigeria found a significant positive relationship between CCC and corporate profitability; while Öner (2016) in Turkey found that CCC had a significant negative impact on profitability. The latter was also consistent with the study by Uyar (2009) that found a significant negative correlation between CCC and ROA, and a non-significant correlation between CCC and ROE. Using empirical data from non-financial firms in South Africa, Oseifuah and Gyekye (2016) found a negative relationship between working capital management and corporate profitability. In Canada, Pratheepkanth (2011) using a sample of firms listed on the Canadian Securities Exchange for the year 2009 showed a significant negative correlation between CCC and profitability.

2.2 Theoretical Framework

2.2.1 Liquidity Preference Theory (LPT)

"LPT was developed by economist John Keynes in 1936. The theory argues that when all other things are kept constant, investors prefer liquid investments to illiquid ones and will always demand a premium for investments that have longer maturity periods" (Too, Kubasu, & Langat, 2016). According to the theory, "money is the most liquid asset. The more quickly an asset is converted into money, the more liquid the asset is. When an asset is easily converted into cash, it provides liquidity for the company in its day-to-day operations, it enables the company to pay its short-term obligations and it is used as well to invest in working capital. The demand for liquidity is determined by three motives which are transactional, speculative and precautionary" (Mandiefe, 2016). "The transaction motive bridges the gap between receipt of income and planned expenditures; the precautionary motive-to provides a reservoir of purchasing power that can be used to finance unanticipated expenditures, and the speculative motive-to satisfies the desire to hold wealth in the most liquid form if one express interest rates on alternative assets to rise, thereby causing capital losses" (Keynes, 1936).

2.3 EMpiricla Review

Zakari and Saidu (2016) investigated "the impact of the cash conversion cycle on the corporate profitability of Nigerian listed telecommunication firms. The sample comprised 8 ICT firms listed on the Nigerian Stock Exchange. Secondary data was collected from 2010 to 2014. Multiple linear regression was used to analyse the data. The study found a significant positive relationship between the cash conversion cycle and corporate profitability".

Öner (2016) investigated "the impact of working capital management on the profitability of firms in Turkey. The sample comprised 110 manufacturing firms listed on Borsa Istanbul for the period 2005 to 2014. The study used a panel data methodology. The study found that the cash conversion cycle had a significant negative impact on profitability".

Oseifuah and Gyekye (2016) investigated "the impact of working capital management on profitability in South Africa. The sample comprised 75 non-financial firms listed on the Johannesburg Stock Exchange (JSE). They used panel data methodology to analyse financial data obtained from I-Net Bridge and BF McGregor for 10 years, from 2003 to 2012. Profitability was proxied by return on assets. The study showed a negative relationship between working capital management and corporate profitability".

Ukaegbu (2014) examined "the relationship between working capital efficiency and corporate profitability in four African countries, Egypt, Kenya, Nigeria and South Africa. Secondary data was obtained from the Orbis database for the period 2005–2009. The study revealed a strong negative relationship between profitability, measured through net operating profit, and cash conversion cycles across different industrialisation typologies".

Yazdanfar and Öhman (2014) investigated "the impact of the cash conversion cycle on the profitability of Swedish small and medium-sized enterprises (SMEs) over a period of 4 years, from 2008 to 2011. They employed a seemingly unrelated regression (SUR) model to analyse cross-sectional panel data covering 13,797 SMEs operating in four industries. The study found that the cash conversion cycle significantly affects profitability".

Yasir, Majid, and Yousaf (2014) examined "the relationship between the cash conversion cycle and the performance of cement firms in Pakistan. They used a sample of 16 firms selected from the cement industry of Pakistan, for six years from 2007 to 2012. Correlation and regression were used to examine the relationship. The study found a negative relationship between the cash conversion cycle and profitability, measured via return on assets".

Panigrahi (2013) examined "the relationship between the cash conversion cycle and profitability in India. The sample comprised the top five Indian cement companies from 2001 to 2010. The regression results showed that the cash conversion cycle had a significant and positive relationship with return on equity; but, a non-significant positive association with return on assets".

Majeed, Makki, Saleem, and Aziz (2013) examined "the relationship between the cash conversion cycle and the profitability of Pakistani manufacturing firms. The sample comprised 32 randomly selected companies from three manufacturing sectors i.e. chemical, automobiles and construction & material for a period of five years, from 2006 to 2010. Correlation and regression were used to analyse the data. The study found that the average receivables collection period, average inventory conversion period, and cash conversion cycle have a negative relationship with the firm's performance (ROA, ROE, and EBIT). The average payment period had a positive relationship with ROE and EBIT".

Anser and Malik (2013) evaluated "the effect of the cash conversion cycle on the profitability of manufacturing firms listed on the Karachi Stock Exchange of Pakistan. The dependent variables were ROE and ROA. The duration of the study was from 2007 to 2011. The regression results showed that the cash conversion cycle had a significant inverse association with return on assets and equity".

Ben-Caleb, Olubukunola, and Uwuigbe (2013) investigated "the relationship between liquidity and profitability of manufacturing firms in Nigeria. The sample comprised 30 manufacturing companies listed on the Nigeria Stock Exchange for a period of 5 years, from 2006 to 2010. The study found that the current ratio and liquid ratio were positively related to profitability, while, the CCC was negatively related to profitability. However, all relationships were statistically insignificant".

Murugesu (2013) examined "the effect of the cash conversion cycle on the profitability of companies in Sri Lanka. The sample comprised ten listed plantation companies between 2008 and 2012. She used correlation and linear regression analysis. The correlation analysis showed a significant negative relationship between the cash conversion cycle and ROA, ROE and Net Profit. The regression result showed a negative effect of CCC on ROA, ROE, and net profit".

3.0 Methodology

The study made use of an ex post facto research design. Ex post facto research design is a systematic empirical inquiry, in which the observer has no direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. The population comprised quoted manufacturing firms on the Nigerian Stock Exchange as of 31st December 2017. Quoted companies are classified under eleven sectors: Agriculture; Construction/Real Estate; Consumer goods; Financial Services; Healthcare; Industrial Goods; Information & Communications Technology; Natural Resources; Oil & Gas; Services; and, Conglomerates. However, employing purposive sampling; the authors selected all companies classified under the consumer goods sector of the Nigerian Stock Exchange (See Appendix I). The study relied on secondary data obtained from the annual financial statements of the selected companies. The data used in computing the operational variables of the study were obtained from the statement of comprehensive income and statement of financial position. The study used a panel data method, the choice of this method is because panel data is more useful in studying the dynamics of adjustment and is better able to identify and measure effects that are simply not detectable in pure cross-sections or pure time-series data. Moreover, many variables can be more accurately measured at the micro level and biases resulting from aggregation over firms or individuals are eliminated **(**Kithii, 2008). The study employed regression analysis to investigate the causal relationship between the variables.

3.1 Model Specification

$ROA_{it} = \alpha + CCC_{it} + FS_{it} + LEV_{it} + \mu$.....1

$ROE_{it} = \alpha + CCC_{it} + FS_{it} + LEV_{it} + \mu$.....2

Where:

ROA	=	Return on Assets
ROE	=	Return on Equity
FS	=	Firm Size
LEV	=	Leverage
α	=	Constant
μ	=	error term

Table 1 Description of Variables

	Dependent variables
ROA	Net Profit/Average Total Assets
ROE	Net Profit/Average Total Shareholders' Equity
CCC	**Independent variable**
	Receivables Collection Period = (Average Accounts Receivables/Sales) x 365 Payables Payment Period = (Average Accounts Payables/Cost of Purchases) x 365 Cash Conversion Cycle = Inventory Holding Period + Receivables Collection Period – Payables
CCC	Payment Period
	Control variables
FS	The closing value of Total Assets
LEV	Debt/Equity

Source: Authors' computation from financial statements

4.0 Data Analysis, Result and Discussion

4.1 Descriptive Statistics

Table 2: Descriptive statistics of the study variables

	FS	LEV	CCC	ROA	ROE
Mean	9.8E+10	0.23456	362.191	0.07636	-0.0894
Median	5.6E+10	0.18876	27.2872	0.0456	0.08402
Maximum	5.4E+11	1.58084	26571.3	1.97365	4.13634
Minimum	0	-3.4856	-16389	-3.0218	-23.022
Std. Dev.	1.2E+11	0.53547	3590.18	0.41417	2.61942
Skewness	1.72356	-3.3266	3.95502	-0.7337	-7.7098
Kurtosis	5.24561	25.5356	35.1827	30.8382	65.2478
Jarque-Bera	103.669	3381.73	6727.06	4759.85	25189.3
Probability	0	0	0	0	0
Observations	147	147	147	147	147

Source: E-views Software Ver. 9.0

Table 3: Correlation matrix independent variables for the study

	FS	LEV	CCC
FS	1	0.10167	-0.0495
LEV	0.10167	1	-0.0529
CCC	-0.0495	-0.0529	1

Source: E-views Software Ver. 9.0

Table 3 above, showed a negative relationship between the cash conversion cycle, leverage and closing assets (i.e., the proxy form firm size).

4.2 Test of Hypotheses

4.2.1 Analysis of hypothesis one

H_1: There is a significant positive relationship between the cash conversion cycle and ROA.

Table 4: Regression results for hypothesis one

Dependent Variable: ROA				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.0826	0.0462	1.7870	0.0761
FS	0.0000	0.0000	-0.5026	0.6160
LEV	0.0342	0.0650	0.5266	0.5993
CCC	-0.0000	0.0000	-0.0779	0.9380
R-squared	0.0034	Mean dependent var		0.0764
Adjusted R-squared	-0.0175	S.D. dependent var		0.4142
S.E. of regression	0.4178	Akaike info criterion		1.1191
Sum squared resid	24.9589	Schwarz criterion		1.2005
Log-likelihood	-78.2537	Hannan-Quinn criter.		1.1522
F-statistic	0.1629	Durbin-Watson stat		1.3132
Prob(F-statistic)	0.9212			

Source: E-views Software Ver. 9.0

The model showed a low R squared value of .003 (R^2 measures the proportion of the variance in the dependent variable that is explained by the independent variables); and, a negative Adjusted R square value of -0.017, from which we can conclude that the overall model is weak. The F statistic (ratio of the mean regression sum of squares divided by the mean error sum of squares) which is used to check the statistical significance of the model showed a value of 0.16; p-value > .05; therefore the hypothesis that all the regression coefficients are zero is not rejected. However, the t statistic of our variable of interest (CCC) is -0.077 (p>.05), confirming that CCC had a negative but not statistically significant relationship with ROA; thus, the alternate hypothesis is rejected and null accepted. The GLS results show that the only significant coefficient is the receivables collection period in days (p < .10); others were not significant.

4.2.2 Analysis of hypothesis two

H_2: There is a significant positive relationship between the cash conversion cycle and ROE.

Table 5: Regression results for hypothesis two

Dependent Variable: ROE				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.98885	0.19411	-5.0942	1.09E-06
FS	7.34E-13	1.20E-12	0.61198	0.54152
LEV	3.607884	0.27287	13.2221	1.42E-26
CCC	-5.06E-05	4.05E-05	-1.2484	0.21392
R-squared	0.560692	Mean dependent var		-0.0894
Adjusted R-squared	0.551476	S.D. dependent var		2.61942
S.E. of regression	1.754279	Akaike info criterion		3.98883
Sum squared resid	440.0817	Schwarz criterion		4.0702
Log-likelihood	-289.179	Hannan-Quinn criter.		4.02189
F-statistic	60.83739	Durbin-Watson stat		1.05765
Prob(F-statistic)	2.07E-25			

Source: E-views Software Ver. 9.0

The model showed an R squared value of .56 (R^2 measures the proportion of the variance in the dependent variable that is explained by the independent variables); and, an Adjusted R square value of .55, from which we can conclude that the overall model is significant with a moderate high explanatory power (R^2 = .55). Therefore the independent variables explain approximately 56% of the variance in the dependent variable. The F statistic (ratio of the mean regression sum of squares divided by the mean error sum of squares) which is used to check the statistical significance of the model showed a value of 60.837 and p-value < .05; therefore the hypothesis that all the regression coefficients are zero is rejected. However, the t statistic of our variable of interest (CCC) is -1.248 (p>.05), confirming that CCC had a negative but not statistically significant relationship with ROE; thus, the alternate hypothesis is rejected and null accepted. The GLS results showed that inventory turnover in days and payables payment periods was significant (p<.01); while the receivables collection period in days was not significant.

4.3 Discussion

The results showed that there is no significant positive relationship between the cash conversion cycle and return on assets. Yasir, Majid, and Yousaf (2014) in Pakistan reported a negative relationship between the cash conversion cycle and return on assets. Panigrahi (2013) on a sample of firms in India found a non-significant positive association between cash conversion cycle and return on assets. Majeed, Makki, Saleem, and Aziz (2013) on a

sample of Pakistani manufacturing firms found that the cash conversion cycle has a negative relationship with return on assets. Ganesan (2007) in the U. S. showed that the cash conversion cycle has a non-significant effect on return on assets. Murugesu (2013) "on a sample of plantation firms in Sri Lanka; showed a significant negative relationship between cash conversion cycle and ROA". Rathika and Nimalathasan (2012) in Sri Lanka; also showed "a significant negative correlation between the cash conversion cycle and return on assets". Uyar (2009) in Turkey showed "a significant negative correlation between the cash conversion cycle and return on assets".

Contrary to this, Attari and Raza (2012) on a sample of firms from four sectors in Pakistan reported a positive significant relationship between cash conversion cycle and return on total assets. Other studies have also shown non-linear relationships. The study by Anser and Malik (2013) on a sample of manufacturing firms listed on the Karachi Stock Exchange, Pakistan; revealed a significant inverse association between cash conversion cycle and return on assets.

There is no significant positive relationship between the cash conversion cycle and return on equity. Majeed, Makki, Saleem, and Aziz (2013) in Pakistan found a negative relationship between average receivables collection period, average inventory conversion period, cash conversion cycle and ROE. However, the results also demonstrated that the average payment period has a positive relationship with ROE. Murugesu (2013) in Sri Lanka; showed a significant negative relationship between cash conversion cycle and ROE. Attari and Raza (2012) in Pakistan showed a non-significant positive relation between the cash conversion cycle and return on equity. Uyar (2009) in Turkey revealed a non-significant relation between the cash conversion cycle and return on equity.

Contrary to this, Panigrahi (2013) on a sample of cement manufacturing companies in India; showed that the cash conversion cycle has a positive and significant relationship with return on equity. An inverse relationship between the cash conversion cycle and return on equity was also found by Anser and Malik (2013) in Pakistan.

5.0 Conclusion and Recommendations

The study concludes that the cash conversion cycle negatively affects the firm performance. The empirical results showed that there is a negative but not significant effect of the cash

conversion cycle on return on assets (p >.05); and, there is a negative but not significant effect of the cash conversion cycle on return on equity (p >.05). This is closely linked to the fact that it determines the liquidity position of the firm and very imperative in the realization of the shareholder wealth maximization objective. Based on this, the recommends that managers pay crucial attention to the working capital management components especially as it affects the value of the firm; and the, adoption of Advanced Manufacturing Techniques and other modern inventory handling procedures; such as the Just-in-Time (JIT) system, etc.

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Appendix I

1. DN Tyre & Rubber Plc.
2. Champion Breweries Plc.
3. Golden Guinea Breweries Plc.
4. International Breweries Plc.
5. Nigerian Breweries Plc.
6. 7-up Bottling Company Plc.
7. Dangote Flour Mills Plc.
8. Dangote Sugar Refinery Plc.
9. Flour Mills Nigeria Plc.
10. Honeywell Flour Mill Plc.
11. Multi-Trex Integrated Plc.
12. N. Nigeria Flour Mills Plc.
13. Union Dicon Salt Plc.
14. Cadbury Nigeria Plc.
15. Nestle Nigeria Plc.
16. Nigerian Enamelware Plc.
17. Vitafoam Nigeria Plc.
18. P.Z. Cussons Nigeria Plc.
19. Unilever Nigeria Plc.
20. Mcnichols Plc.
21. Nascon Allied Industries Plc.

Source: Nigerian Stock Exchange Website